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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/893,199	06/27/2001	Nelson T. Rotto	10277US01	3864

7590 05/14/2003

Attention: Amelia A. Buharin
Imation Corp.
Legal Affairs
P.O. Box 64898
St. Paul, MN 55164-0898

EXAMINER

ANGEBRANDT, MARTIN J

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 05/14/2003

4

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/893,199

Applicant(s)

ROTT, NELSON T.

Examiner

Martin J Angebrannt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 October 2001 and 29 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The polyurethane is a matrix, not a binder. A binder is a fully formed polymer added to the coating mixture. The specification injects the polyol and polyisocyanate together with the actinic monomer and a catalyst to in-situ cause the reaction of the polyol and polyisocyanate to form a polyurethane matrix. (16/12-20). See also Dhar et al. EP 0945762 which describes the results as a polymeric matrix. The benefit is related to the reaction rate and viscosity of the polyisocyanate, not any particular properties of the resulting urethane (12/10-14 and 11/21-26 of the instant specification). The examiner suggests changing "binder" to matrix in the claims and specification and holds that this change would not be introducing new matter.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-6,8-15,17-23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dhar et al. EP 0945762, in view of Ueda JP 05-323850 and Chang '478.

Dhar et al. EP 0945762 describes the formation of thick holographic recording media using two independent polymerization reactions which are compatible. The compatibility prevents phase separation. The first polymerization forms a polymeric matrix with the

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photosensitive monomeric material dispersed throughout the polymeric matrix. [0009-0010].

The resulting matrix containing the monomeric material should be flexible [0013]. The formation of holograms, waveguides or the like is disclosed. [0015]. Various polymerization reactions, including forming isocyanate-hydroxyl step polymerization (urethane formation) may be used to form the polymeric matrix [0017]. Useful monomers are disclosed together with refractive index concerns. [0019]. Urethanes are compatible with monomers and react independently from the most monomers. [0026-0033 and 0041]. The use of substrates on both sides of the medium with spacers to control the thickness is disclosed. [0034]. Example 1 uses 0.2519 g (68.54 wt%) of diisocyanate-terminated polypropylene glycol, 0.047 g (12.8 wt%) of dihydroxylpolypropylene glycol, 0.0678 g (18.45 wt%) of 4-chlorophenyl acrylate (0.051+0.0168), 0.00063 g (0.17 wt%) CGI 784 and 0.0002 g (0.05 wt%) dibutyltin dilaurate. [0041]. The use of page reading techniques is disclosed with respect to Psaltis et al. [0003]

Ueda JP 05-323850 discloses the use of various isocyanates, such as 1,6-hexamethylene diisocyanate, in forming a crosslinked crosslinked matrix. [0047]. Disclosed monomers, include acrylates, such as tribromophenyl acrylate and tetrabromophenyl acrylate. [0011-0019].

Chang '478 teaches that it is well known in the art that primary aliphatic isocyanates, such as 1,6-hexamethylene diisocyanate, react significantly faster than secondary or tertiary isocyanates. (124-31).

It would have been obvious to one skilled in the art to modify the invention of example 1 of Dhar et al. EP 0945762 by using other polyisocyanates, such as 1,6-hexamethylene diisocyanate, in forming a crosslinked crosslinked matrix based upon the disclosure of Ueda JP 05-323850 that the use of this polyisocyanate is known to be useful in the holographic arts and

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the teachings of Chang '478 that the cure rate of this polymer is much quicker than secondary or tertiary isocyanates which results in a time savings in preparation of the medium for recording holograms.

For the purposes of formulating prior art based rejections the claims, the examiner has interpreted the term binder as limited to a matrix based upon the disclosure of the instant specification. Further basis for this appears in the disclosure of Dhar et al. EP 0945762, which uses the same technique with a secondary polyisocyanate. Further, it would have been obvious to use protective layers/substrates on both side of the medium to prevent mechanical damage to the holographic recording layer.

5. Claims 1-6,8-15,17-23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dhar et al. EP 0945762, in view of Ueda JP 05-323850 and Chang '478 combined with Keys et al. '152 and/or JP 06-282209.

Keys et al. '152 discloses photopolymerizable holographic recording media, which use liquid monomers including halogenated aromatic acrylate monomers (5/10-26). These include preferred monomers, such as pentachlorophenyl acrylate and 2,4,6-tribromophenyl acrylate. (5/33-44).

JP 06-282209 teaches the use of monomers, such as pentabromophenyl acrylate, which have a high refractive index. [0014].

In addition to the basis provided above, it would have been obvious to one skilled in the art to use monomers known to be useful in holographic recording, particularly those having a high refractive index and contributing to compatibility, such as the halogenated acrylates, tribromophenyl acrylate or pentabromophenyl acrylate disclosed by Keys et al. '152 and/or JP

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06-282209, in place of the 4-chlorophenyl acrylate in the combination of Dhar et al. EP 0945762, in view of Ueda JP 05-323850 and Chang '478, based upon the compatibility taught in Dhar et al. EP 0945762 at [0039-0041] and desirability of high refractive index monomers taught in Dhar et al. EP 0945762 at [0019].

6. Claims 1-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dhar et al. EP 0945762, in view of Ueda JP 05-323850 and Chang '478 combined with (Keys et al. '152 and/or JP 06-282209) and (Nishio et al. '218 and/or Sommerfield et al. '998)

Nishio et al. '218 teaches biurets of hexamethylene diisocyanates as being preferred. (15/52-16/3). The use of these in holograms is disclosed. (12-22) Example 2 disclosed the viscosity, light transmission properties and the low shrinkage on curing. (table 2)

Sommerfield et al. '998 teaches the use of trimers of hexamethylene diisocyanates to form polymeric networks/matrices which include monomeric materials. (21/35-45). The use of this in holographic systems is disclosed. (15/18-32). Monomeric materials are disclosed in columns 16 and 17.

In addition to the basis provided above, it would have been obvious to one skilled in the art to modify the invention of Dhar et al. EP 0945762, combined with Ueda JP 05-323850 and Chang '478 together with (Keys et al. '152 and/or JP 06-282209) by using dimers (biurets) or trimers of hexamethylene diisocyanates disclosed by Nishio et al. '218 and/or Sommerfield et al. '998 rather than diisocyanate-terminated polypropylene glycol as these are primary isocyanates and would be expected to react faster than secondary or tertiary isocyanates and based upon their previous disclosed usefulness in holographic recording compositions.

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7. Claims 1-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dhar et al. EP 0945762, in view of Ueda JP 05-323850 and Chang '478 combined with (Keys et al. '152 and/or JP 06-282209) and (Nishio et al. '218 and/or Sommerfield et al. '998), further in view of Kovar et al. 2002/0193460, Sugiyama et al. '086 or Mizuno et al. '147.

Kovar et al. 2002/0193460 teaches hexamethylene diisocyanate, such as DESMODUR N3400 as having low volatility, low viscosity and toxicity [0080,0081,0083,0084]

Sugiyama et al. '086 teaches that 1,6-hexamethylene diisocyanate, dimers and trimers of this compound have advantages in safeness of handling, and no discoloration. (13/36-52).

Mizuno et al. '147 teaches that 1,6-hexamethylene diisocyanate, dimers and trimers of this compound have advantages in safeness of handling, and no yellowing. (4/29-39).

In addition to the basis provided above, the examiner cites the teachings of Kovar et al. 2002/0193460, Sugiyama et al. '086 or Mizuno et al. '147 which specifically describe the benefits of using 1,6-hexamethylene diisocyanate, dimers and trimers of this compound in terms of low volatile emissions, safety and no discoloration/yellowing, which would be advantages desirable and realizable in the invention of over Dhar et al. EP 0945762 combined with Ueda JP 05-323850 and Chang '478 together with (Keys et al. '152 and/or JP 06-282209) and (Nishio et al. '218 and/or Sommerfield et al. '998).

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


Haugh '526 teaches the use of protective layers to prevent oxygen intrusion into the holographic recording layer and to allow handling of tacky holographic layer. (6/25-48 and 3/22-55).

Settachayanon et al. 2003/0044691 and Trentler et al. 2003/0083395 seek coverage for similar subject matter, but lack a good date to form the basis for a rejection.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J Angebranndt whose telephone number is 703-308-4397. The examiner can normally be reached on Available Mondays-Thursday and alternative Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 703-308-2464. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



Martin J Angebranndt
Primary Examiner
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May 12, 2003